



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,694	12/16/2003	Shigetaka Hamada	10517/198	3515
23838 7590 01/29/2007 KENYON & KENYON LLP 1500 K STREET N.W. SUITE 700 WASHINGTON, DC 20005			EXAMINER BERHANU, SAMUEL	
			ART UNIT 2838	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/29/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/735,694	Applicant(s) HAMADA ET AL.	
	Examiner Samuel Berhanu	Art Unit 2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/22/2206.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchner et al. (DE 196 49 434 C1) in view of Yi et. al. (US 6,586,123).

Regarding Claim 1, Buchner et al. disclose, a diagnostic method for a fuel cell comprising a plurality of cells, comprising: supplying an anode of the fuel cell with hydrogen or a hydrogen-containing gas; supplying a cathode with an inert gas or vacuuming the cathode; measuring a voltage of each cell under a condition in which the hydrogen or the hydrogen-containing gas is supplied to the anode of the fuel cell and the inert gas is supplied to the cathode or the cathode is vacuumed, wherein an operation state of the fuel cell battery is changed when measuring the voltage of a cell; and determining an amount of cross-leak based on the measured gas pressure at the anode, the measured gas pressure at the cathode, and on a measured voltage of each cell. (Page 1, Paragraph 2, Page 2, paragraph 6 and Page 3, Paragraph 1).

Buchner et. al. do not disclose measuring gas pressure at the anode; measuring a gas pressure at the cathode.

Yi et. al. disclose in Figure 1, elements 40 and 42 ring a gas pressure at the anode; measuring a gas pressure at the cathode. (See also Column 4, lines 34-39, lines 44-48).

It would have been obvious to a person having ordinary skill in the art at the time of the invention to use a gas pressure measuring means (instead of calculating the pressure) in Buchner et. al. gas leak determination method as taught by Yi et. al. in order to avoid errors that could be introduced using formulas and mathematical equations.

Regarding Claim 2, Buchner et al. disclose, wherein in the determining step, an amount of hydrogen cross-leak of each cell is determined from the measured voltage of each cell generated based on a principle of a hydrogen concentration cell (Page 2, Paragraph 2).

Regarding Claim 3, Buchner et al. disclose, detecting an amount of the inert gas supplied to the cathode; and calculating an amount of cross-leak based on the pressure of the hydrogen-containing gas at the cathode, on the total pressure of the inert gas supplied to the cathode, and on the amount of the inert gas supplied to the cathode (Page 3, lines 11-30, Page 4, lines 10-29).

Regarding Claim 4, Buchner et al. disclose, wherein the voltage of each cell is measured in a state where the plurality of cells are stacked (Page 1, Paragraph 3)

Regarding Claim 5, Buchner et al. disclose, changing at least one of the gas pressure at the anode and the gas pressure at the cathode when measuring the voltage of each cell (Page 2, Paragraph 2) (noted that the formula in Page 3, line 15 teaches that the voltage of each cell can be calculated with different value of pressure).

Regarding Claim 7, Buchner et al. disclose, wherein the inert gas supplied to the cathode is nitrogen (Page 3, line 3).

3. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buchner et al. (DE 196 49 434 C1) in view of Yi et. al. (US 6,586,123), and further in view of Reher et. al. (US 5,215,834).

Regarding Claim 6, neither Buchner et al. nor Yi et. al. disclose explicitly introducing a cooling medium into a battery of the fuel cell; and changing a temperature of the cooling medium when measuring the voltage of each cell. However, Reher et. al. disclose in Figures 1 and 4, a cooling medium (a flow path) into a battery of the fuel cell; and changing a temperature of the cooling medium when measuring the voltage of each cell (Column 2, lines 34-64). It would have been obvious to a person having ordinary skill in the art at the time of the invention to use air flow means as taught by Reher et. al. in Buchner Fuel cell test system in order to maintain a desire temperature during fuel cell test and obtain accurate test result, and also to prevent the system from discharging below a predetermined stage of charge.

4. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buchner et al. (DE 196 49 434 C1) in view of Muchinc et. al. (US 6,558,824), and further in view of Yi et. al. (US 6,586,123).

Regarding Claim 8, Buchner et al. disclose, a diagnostic method for a fuel cell comprising a plurality of cells, comprising: supplying an anode of the fuel cell with hydrogen or a hydrogen-containing gas; measuring a voltage of each cell under a condition in which the hydrogen or the hydrogen-containing gas is supplied to the anode

Art Unit: 2838

of the fuel cell, and determining an amount of cross-leak based on the measured gas pressure at the anode, the measured gas pressure at the cathode and on a measured voltage of each cell (Page 1, Paragraph 2, Page 2, paragraph 6 and Page 3, Paragraph 1). Buchner et. al. do not disclose explicitly the cathode is vacuumed. However, Muchinc et. al. disclose in the abstract, column 2, lines 1-5, and claims 8 and 19, the cathode is vacuumed. It would have been obvious to a person having ordinary skill in the art at the time of the invention to add a vacuum injecting means in Buchner et. al. fuel cell stack as taught by Muchine et. al. in order to remove the water to ensue proper test results and provide effective fuel cell leak monitoring system. Neither Buchner et. al. nor Muchinc et. al. disclose measuring a gas pressure at the anode; measuring a gas pressure at the cathode at the cathode.

Yi et. al. disclose in Figure 1, elements 40 and 42, measuring a gas pressure at the anode; measuring a gas pressure at the cathode at the cathode (see also Column 4, lines 34-39, lines 44-48).

It would have been obvious to a person having ordinary skill in the art at the time of the invention to use a gas pressure measuring means (instead of calculating the pressure) in Buchner et. al. gas leak determination method as taught by Yi et. al. in order to avoid errors that could be introduced using formulas and mathematical equations.

Regarding Claim 9, Buchner et al. disclose, wherein in the determining step, an amount of hydrogen cross-leak of each cell is determined from the measured voltage of each cell generated based on a principle of a hydrogen concentration cell (Page 2, Paragraph 2)

Regarding Claim 10, Buchner et al. disclose, wherein the voltage of each cell is measured in a state where the plurality of cells are stacked (Page 1, Paragraph 3)

Regarding Claim 11, Buchner et al. disclose, changing at least one of the gas pressure at the anode and the gas pressure at the cathode when measuring the voltage of each cell (Page 2, Paragraph 2) (noted that the formula in Page 3, line 15 teaches that the voltage of each cell can be calculated with different value of pressure).

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buchner et al. (DE 196 49 434 C1) in view of Muchinc et. al. (US 6,558,824) and in view of Yi et. al. (US 6,586,123) , as applied to claim 8 above, and further in view of Reher et. al. (US 5,215,834).

Regarding Claim 12, Buchner et al. , Muchinc et. al. and Yi et. al. do not disclose explicitly introducing a cooling medium into a battery of the fuel cell; and changing a temperature of the cooling medium when measuring the voltage of each cell. However, Reher et. al. disclose in Figures 1 and 4, a cooling medium (a flow path) into a battery of the fuel cell ; and changing a temperature of the cooling medium when measuring the voltage of each cell (Column 2, lines 34-64). It would have been obvious to a person having ordinary skill in the art at the time of the invention to use air flow means as taught by Reher et . al.. in Buchner Fuel cell test system in order to maintain a desire temperature during fuel cell test and obtain accurate test result, and also to prevent the system from discharging below a predetermined stage of charge.

Response to Arguments

6. Applicant's arguments filed 11/22/2006 have been fully considered but moot in view of new ground (S) of rejection, or not persuasive.

Buchner et al. disclose in Pages 3 and 4 mathematical models that serve to determine a leakage in a Fuel cell. These mathematical models are

$$U = (RT/zF) \cdot \ln(p_1/p_2),$$

$$p_1 = p_2 \cdot \exp(-UzF/RT),$$

$$U = (RT/zF) \cdot \ln(p_1/p_2),$$

The mathematical models are clearly indicating the cell voltage, and the pressures at the cathode and anode sides of the fuel cell are used to identify the leak in the fuel cell.

Conclusion

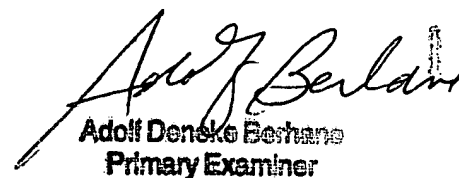
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Berhanu whose telephone number is 571-272-8430. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl Easthom can be reached on 571-272-1989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2838

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SB


Adolf Deneko Berchano
Primary Examiner